



**U.S. Army Research Institute  
for the Behavioral and Social Sciences**

**Research Report 1837**

**Training Requirements of Digital System Operators  
in a Stryker Brigade Combat Team**

**Brooke B. Schaab and J. Douglas Dressel  
U.S. Army Research Institute**

**LTC Peter B. Hayes  
U.S. Army Reserve**

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**ZITA M. SIMUTIS  
Director**

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Technical review by

Dan Horn, U.S. Army Research Institute  
William R. Sanders, U.S. Army Research Institute

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**Brooke B. Schaab**  
U.S. Army Research Institute

**J. Douglas Dressel**  
U.S. Army Research Institute

**LTC Peter B. Hayes**  
U.S. Army Reserve

**Research and Advanced Concepts Office**  
**Paul A. Gade, Chief**

**U.S. Army Research Institute for the Behavioral and Social Sciences**  
**2511 Jefferson Davis Highway, Arlington, Virginia 22202-3926**

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## **FOREWORD**

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Soldiers trained on the U.S. Army's most advanced digital systems are leading transformation. Understanding how to operate these new technologies is just the beginning. Soldiers must become skilled at leveraging technology to better accomplish their military missions. In an effort to understand how Soldiers meet these complex technological challenges, this research was conducted by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI), with assistance from the second Stryker Brigade Combat Team (SBCT) at Fort Lewis, WA.

The Advanced Training Methods Research Unit, as part of ARI Work Package 209, "Principles for Training Digital Skills" focuses on documenting how Soldiers report they acquire mastery of their digital systems and how this mastery supports transformation principles. Through administration of questionnaires and conducting interviews, researchers were able to draw the general conclusions summarized in this report.

Recommendations for training were shared with the training community at Fort Lewis, WA and members of the Space and Decision Superiority Cell at Joint Forces Command. These findings will contribute to a longitudinal report looking at digital-system training over three years that includes data from the first and second SBCT.



MICHELLE SAMS  
Technical Director

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The authors extend their most sincere gratitude to the Soldiers who unselfishly participated in our data collection efforts. Their assistance and enthusiasm added immeasurable benefit to the U.S. Army's understanding of how training influences network-centric collaboration.

The quality of the data collected was greatly enhanced by the participation of LTC Peter B. Hayes. LTC Hayes' knowledge of Soldiers and his dedication to improving their training helped researchers ask the right questions in the right way. His leadership skills put Soldiers at ease, resulting in open discussion of relevant issues.

The authors also express their appreciation to Dr. Guy L. Siebold who as Acting Chief of the Advanced Training Methods Research Unit from January, 2004 to January, 2005 provided insightful guidance and unwavering support for this research effort.

# TRAINING REQUIREMENTS OF DIGITAL SYSTEM OPERATORS IN A STRYKER BRIGADE COMBAT TEAM

## EXECUTIVE SUMMARY

### Requirement:

The U.S. Army will be increasingly conducting operations where personnel may be unacquainted with one another, often from other Services, and connected via digital networks rather than operating face-to-face. To enhance future mission success, this research asked operators of some of the Army's most advanced digital systems which training practices were most beneficial in training them to share information and collaborate in net-centric environments.

### Procedure:

Researchers administered questionnaires and interviewed 50 Soldiers at Fort Lewis, Washington who had been trained on the Army's most advanced digital technologies. The questionnaire addressed the Soldier's training background, types of training environments and areas regarding interoperability and collaboration across digital systems. Open-ended questions concerned digital training practices and collaborative efforts experienced by the Soldiers. Small-group interviews focused on training practices, training preferences and suggested improvements.

### Findings:

Soldiers expressed a need for systems integration training and opportunities to practice communicating with other digital systems. Soldiers expressed frustration when they were unable to interact successfully with other systems. Only 11 percent of the Soldiers reported that they received any systems integration training and this training was part of another course. During focused interviews, Soldiers described how this lack of system integration training impacted training success. Soldiers reported that the digital expertise of NCOs is increasing so they can better train their Soldiers and rely less on contractors for both training and system maintenance. Soldiers also expressed a need for more in-depth, hands-on field training on their own digital system.

### Utilization of Findings:

This research effort shows the progression of digital system acceptance and utilization. It also suggests the continued need for increased opportunities for hands-on training both for the user's system expertise and for requisite collaboration and interoperability performance needed in a net-centric environment. Recommendations were made to the SBCT training community and the Joint Forces Command, Space and Decision Superiority Cell, providing training managers with suggestions for improving training in net-centric collaborative environments. The contents of this report will also be presented as part of programmatic briefings to the wider training community.



# TRAINING REQUIREMENTS OF DIGITAL SYSTEM OPERATORS IN A STRYKER BRIGADE COMBAT TEAM

## CONTENTS

	Page
Introduction .....	1
Method .....	1
Objectives.....	2
Demographics of Soldiers .....	2
Findings and Implications .....	3
Digital System Training Today .....	3
Collaboration for Mission Success.....	6
Problems when Communicating/Collaborating using Digital Systems .....	7
Successes when Communicating/Collaborating with Digital Systems.....	11
Recommendations .....	12
References .....	15
Appendix A Digital Task Proficiency Questionnaire .....	A-1
Appendix B Written Questions on Digital Collaboration .....	B-1
Appendix C Interview Questions .....	C-2

### List of Tables

Table 1 Percentage of Soldiers by rank.....	2
Table 2 Number of Soldiers operating each digital system by Military Occupational Specialty (MOS) .....	3
Table 3 Soldiers were asked “To what extent do each of the following tasks apply to your digital team?” .....	6

### List of Figures

Figure 1 Type of digital training received.....	4
Figure 2 Soldiers’ response to, “How would you compare your know-how on your Army digital system to that of your immediate supervisor?” .....	5
Figure 3 Soldiers’ response to, “With what systems do you exchange information?” .....	7
Figure 4 Soldiers’ response to, “How do system problems impact mission?” .....	8
Figure 5 Soldiers’ response to, “How noticeable are “bugs” in your system?” .....	9
Figure 6 Soldiers (n=46) report their two preferred methods for learning digital systems.....	10



## TRAINING REQUIREMENTS OF DIGITAL SYSTEM OPERATORS IN A STRYKER BRIGADE COMBAT TEAM

*Digitization applies information technologies to acquire, exchange, and employ timely data throughout the battlespace...This capability will allow all friendly forces to share a constantly updated and integrated view of the entire battlefield, no matter what the mission, to penetrate the enemy's decision loop, and act faster than he can react.*

- The Army Digitization Report, June 2000

### Introduction

Emerging doctrine and force structure support rapid deployment of dedicated units whose personnel may be unacquainted, possibly from different Services, and be connected via digital networks rather than operating face-to-face. Successful information sharing and collaboration in this net-centric environment is critical for developing high levels of situational awareness necessary for mission planning and execution. This research asked Soldiers operating the U.S. Army's most advanced digital systems: How were you trained, both in the classroom and in exercises, to communicate across systems? What types of training were most successful? What were the consequences of successes and failures in communicating across systems?

To help answer these questions, researchers from the U.S. Army Research Institute (ARI) and U.S. Army personnel administered questionnaires and conducted interviews with operators of Army Battle Command Systems (ABCS) at Fort Lewis during the summer of 2004. Similar data collection efforts have taken place during the spring of 2002 (Schaab & Dressel, 2002) and the winter of 2003.

### Method

Researchers met with groups of four to six Soldiers to gather information on current digital training practices, interoperability, and collaboration using digital systems. Soldiers read and signed a Privacy Act Statement, then the purpose of the research was explained to them prior to beginning data collection.

First, Soldiers were given the Digital Task Proficiency Questionnaire (see Appendix A). This questionnaire sought information on the Soldiers' training background including training for interoperability, training preferences, opportunities for collaboration, computer experience and digital team performance. The Soldiers took about 15 minutes to complete this questionnaire.

Next, each Soldier was given the first of a series of four-to-six questions, depending on the number of participants in the group, concerning digital training and collaboration (see Appendix B). Each question was on a separate sheet of paper. The Soldiers had 5 minutes to write their answers. Then the Soldiers passed their question sheets counter-clockwise to the next Soldier who would answer this new question (Paulus & Yang, 2000). The Soldier could expand upon the previous answer or give a different response; they were instructed to write whatever they thought was appropriate. This rotation of questions and additional responses was continued

until each Soldier answered each of the four-to-six questions. Since there were six questions and groups ranged from four-to-six Soldiers, all Soldiers did not respond to all six items.

Following this, a similar rotation approach was taken by which each Soldier ranked the top two responses to each question. This resulted in each of the questions having four-to-six sets of responses and four-to-six sets of rankings. This information gathering approach is described in detail in Brassard & Ritter (1994).

Finally, we conducted an interview with each group of Soldiers, which generally took 45-60 minutes. The interviews were audio-recorded for later examination. Soldiers were asked to speak freely, give their full and complete impressions of digital training practices, and describe how they used their digital systems to collaborate. Comments were not for individual attribution. The Soldiers did not seem to be constrained or inhibited by the tape recording of the session. The interviews were based on the Soldiers' previous questionnaire and written responses in addition to topics selected from the list of interview topics found in Appendix C.

### *Objectives*

Soldiers were to provide descriptions of:

- Digital system training today,
- Collaboration for mission success,
- Problems when communicating/collaborating using digital systems, and
- Successes when communicating/collaborating using their digital systems.

### *Demographics of Soldiers*

Researchers from ARI administered questionnaires and conducted interviews with operators of the ABCS component systems. Fifty Soldiers at Fort Lewis, WA participated. Soldiers' ranks ranged from E1 to E5, with approximately seventy percent of the Soldiers being E4-to-E5 (see Table 1).

Table 1. Percentage of Soldiers by rank

Rank	Percent
E1	14
E2	10
E3	6
E4	24
E5	46

These Soldiers operated a variety of digital systems, with the overwhelming majority, operating the Force XXI Battle Command Brigade and Below (FBCB2) (see Table 2). Several Soldiers were experienced on more than one system.

Table 2. Number of Soldiers operating each digital system by Military Occupational Specialty (MOS)

MOS	FBCB2	AFATDS	ASAS	MCS	AMDWS	CSSCS
<b>11b</b>	18			4		
<b>11c</b>	5			1		
<b>11d</b>	1					
<b>13d</b>	1	1				
<b>19d</b>	2					
<b>19k</b>	2					
<b>31f</b>	1			1		
<b>31u</b>	1			1		
<b>42a</b>	1					1
<b>63b</b>	1					
<b>63s</b>	2					
<b>74b</b>	1			1		
<b>88m</b>	1					
<b>88n</b>	1			1		1
<b>91k</b>	1					
<b>91w</b>	1					
<b>92f</b>	1					
<b>96b</b>			1			
<b>96u</b>	1		1			
<b>Missing</b>	2			1		
<b>Total</b>	<b>44</b>	<b>1</b>	<b>2</b>	<b>10</b>	<b>0</b>	<b>2</b>

Note: 6 participants did not note the systems that they operated

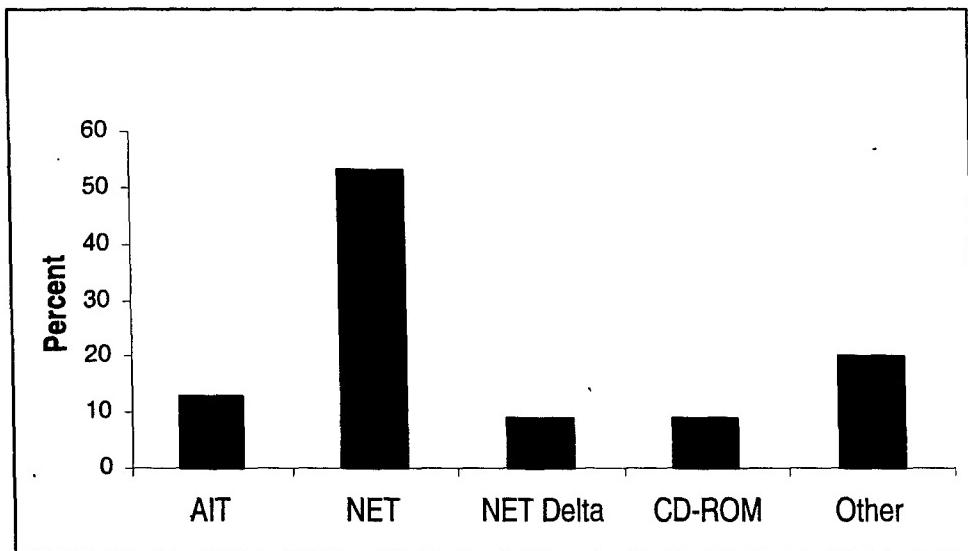
FBCB2-Force XXI Battle Command Brigade and Below; AFATDS-Advanced Field Artillery Tactical Data System; ASAS-All Source Analysis System; MCS-Maneuver Control System; AMDWS-Air Missile Defense Warning System; CSSCS- Combat Service Support Control System

### Findings and Implications

#### Digital System Training Today

##### *How Soldiers learn their systems (Questionnaire, Appendix A).*

Most Soldiers, 53 percent, received training on their systems via New Equipment Training (NET), while 20 percent learned on their own or with assistance from personnel at their unit (category: other, see Figure 1). A new learning method, using CD-ROM has been introduced into training with nine percent of the Soldiers having some training using CD-ROMs or web-based training. This is noteworthy because two years ago none of the Soldiers interviewed reported experiencing this type of training. Still, some Soldiers indicated that they have not been made aware of its availability and how to access it.



*Figure 1.* Questionnaire findings on type of digital training received (N=50). Note: Advanced Individual Training (AIT); New Equipment Training (NET) Delta generally trains software/hardware upgrades.

*System Integration Training (Questionnaire, Appendix A).*

Soldiers stated on their questionnaire, written response to questions, and during their interview that job success requires an understanding of how their system interacts with other systems. Soldiers say that a clear sense of how to collaborate with people operating those other systems and an appreciation of how important collaboration is in achieving and maintaining situational awareness required experience in multiple training exercises that incorporated a variety of scenarios. In one command center, Soldiers actually place two different systems side-by-side and cross-trained each other to promote collaboration. They grasped the need to understand the interrelationship between their roles (Schaab & Dressel, 2002). Such opportunities to foster mutual understanding become more difficult, of course, when members are dispersed.

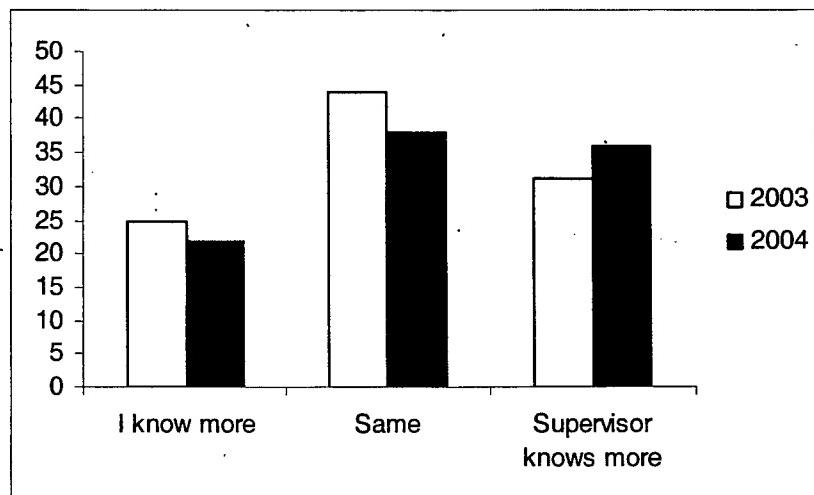
Trainers recognized this need and began incorporating system integration training into NET (Schaab, Dressel, & Moses, 2004). Additionally, trainers themselves were encouraged to cross-train on multiple systems so that they were familiar with how these systems worked together.

Only 11 percent of the Soldiers (5 out of 40 responding on the questionnaire) indicated that they received some system integration training, and this was part of another course. Of these 5 Soldiers, 4 of the 5 found it helpful. Seventy-nine percent of those who had not received system-integration training (22 of 26 Soldiers) believed they need it. They said:

- We need to know how to format messages differently for different systems.
- We need to know how to send messages to other units.
- This would help plenty! You need to see how systems work together.
- It would be nice to see how they all tied together before going in the field.

### *Unit Training.*

As the U.S. Army moves its forces into the 21<sup>st</sup> Century, the introduction of technology has not been painless. During the 2002 data collection involving Soldiers using the U.S. Army's newest digital systems, one problem came up in every focus group held. Almost no one had much experience on a given system. Both Soldiers and their supervisors were being fielded and trained on these new systems at the same time. This meant that peers could not help peers nor could leaders train and supervise their Soldiers on these systems (Felton, Schaab, & Dressel, 2003). During the 2003 and 2004 data collection, Soldiers were asked to compare their know-how on their Army digital system to that of their immediate supervisor (See Figure 2). The findings suggest that supervisors are becoming more adept in using this new technology. As more troops receive training, in both the classroom and in the field, it is suspected that expertise will develop within the units themselves to train new Soldiers and to advance the knowledge of Soldiers using methods other than formal classroom training.



*Figure 2. Soldiers' response on questionnaire to, "How would you compare your know-how on your Army digital system to that of your immediate supervisor?" (N= 49)*

Soldiers were asked to provide a written response to the question, "How does your immediate supervisor assist you in training how to use your digital system to communicate with other systems?" They reported:

- My supervisor answers my questions and gives me additional information that comes from experience.
- He tells me what other systems can do for me.
- He is only slightly more experienced. If he doesn't know, we try to figure it out by playing with it.
- We all work closely together so no one person is really the trainer. We all learn together.
- Hands-on works wonders. Folks in the Army are hands-on people.
- He lets me play around with the system and spend time on it.

- I learn from observation and hands-on.
- I have knowledge on the system so I am the one teaching others. Everyone should know how to use the system.
- We would like to train more with our supervisor to know where his weaknesses are and to help him so he can help us.
- My supervisor doesn't assist me with training because he has not dealt with the system, so I show him. I would like for my supervisor to want to find out more about the system and then let's share our knowledge together.

### *Collaboration for Mission Success*

**COLLABORATION:** Joint problem solving for the purpose of achieving shared understanding, making a decision, or creating a product across the Joint Force and mission partners.

-*Net-Centric Environment Joint Functional Concepts*, January 2005

*Need to communicate/collaborate.*

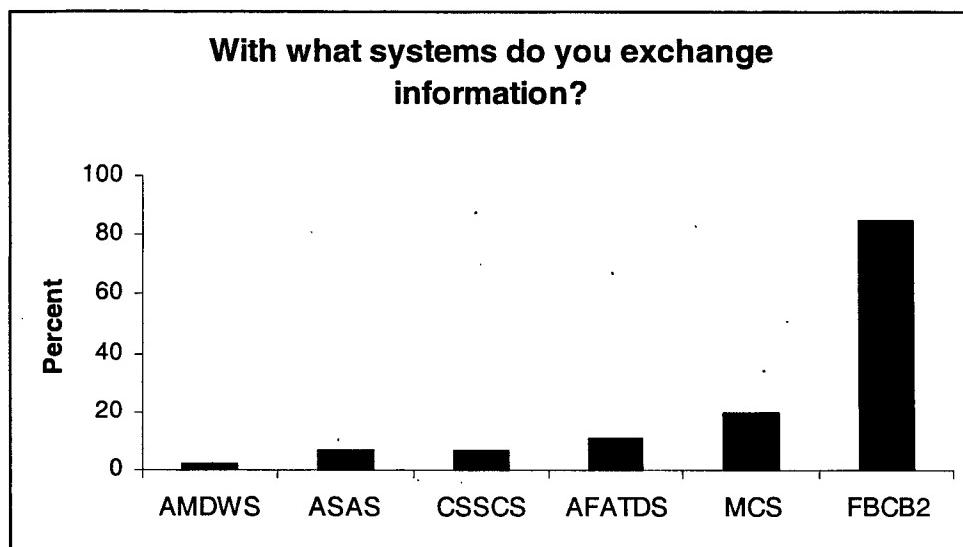
Soldiers agree that (1) mission success depends on being able to exchange information within and between units, and (2) leaders need to closely coordinate digital activities (see Table 3). Despite this understanding of the need to collaborate, most Soldiers report that they do not have sufficient opportunities to train with other digital units.

Table 3. On the questionnaire, Soldiers were asked, "To what extent do each of the following tasks apply to your digital team?" (See Appendix A-4) Note: Table collapsed, with two highest response options and two lowest response options combined.

	No or Small Extent (Percent)	Moderate Extent (Percent)	Quite or Great Extent (Percent)
Successful task/mission performance requires team members to obtain information about the mission and pass it on to other team members in <b>our</b> unit.	16	20	64
Successful task/mission performance requires team members to obtain information about the mission and pass it on to other team members in <b>other</b> units.	8	33	55
Successful task/mission performance is dependent on a leader to closely coordinate the digital activities of all team members.	25	20	51
Successful task/mission performance requires team members to coordinate using their digital equipment.	22	46	32

### *How do Soldiers collaborate?*

The most frequent system-to-system exchange of information was from one FBCB2 operator to another FBCB2 operator, but they did send and receive information from other systems (see Figure 3).



*Figure 3.* Soldiers' responses on the questionnaire to, "What digital system(s) do you send information to?" and "What digital system(s) do you receive information from?" (N=50) AMDWS-Air Missile Defense Warning System ; ASAS-All Source Analysis System; CSSCS- Combat Service Support Control System; AFATDS-Advanced Field Artillery Tactical Data System; MCS-Maneuver Control System; FBCB2-Force XXI Battle Command Brigade and Below

When in the field, 52 percent of the Soldiers frequently or continuously exchange information with other digital systems.

### *Problems When Communicating/Collaborating Using Digital Systems*

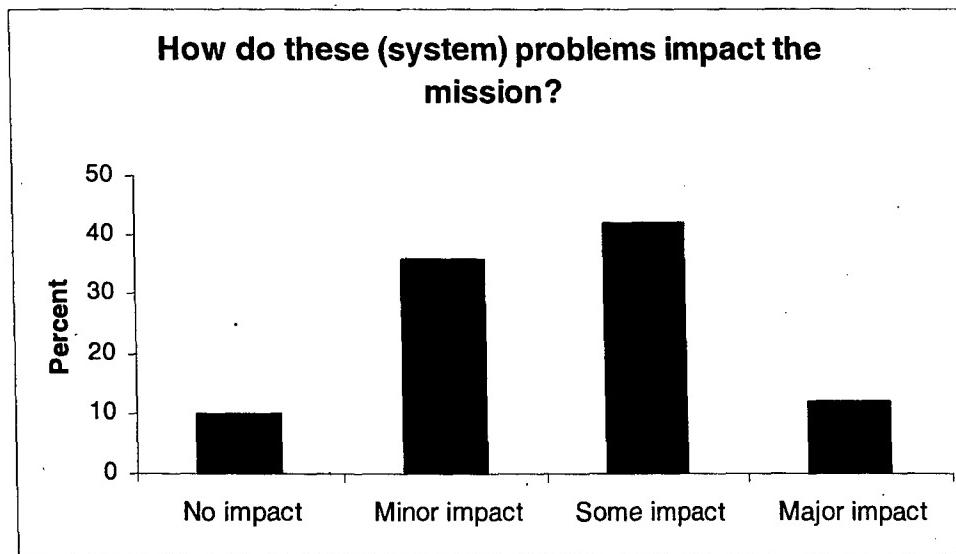
#### *System Problems.*

Soldiers do not rely totally on their digital systems (from Appendix A-3 and focus group). They report problems with missed messages (33 percent), delayed messages (50 percent), and confused messages (21 percent). They tell us:

- Sometimes we can't talk to each other, sending messages between systems is difficult.
- The system locks up and does not show your real position. Nobody knows where you are.

These system problems can impact mission success (see Figure 4) due to uncertainty whether information has been passed and received. Also, Soldiers have added workload when voice communication is needed to confirm electronic messaging. Additional insights associated with

leveraging networked systems to accomplish tasks can be found in *Exploiting FBCB2 Capabilities Through Realistic Feedback* (Leibrecht, Lockaby, & Meliza, 2003).

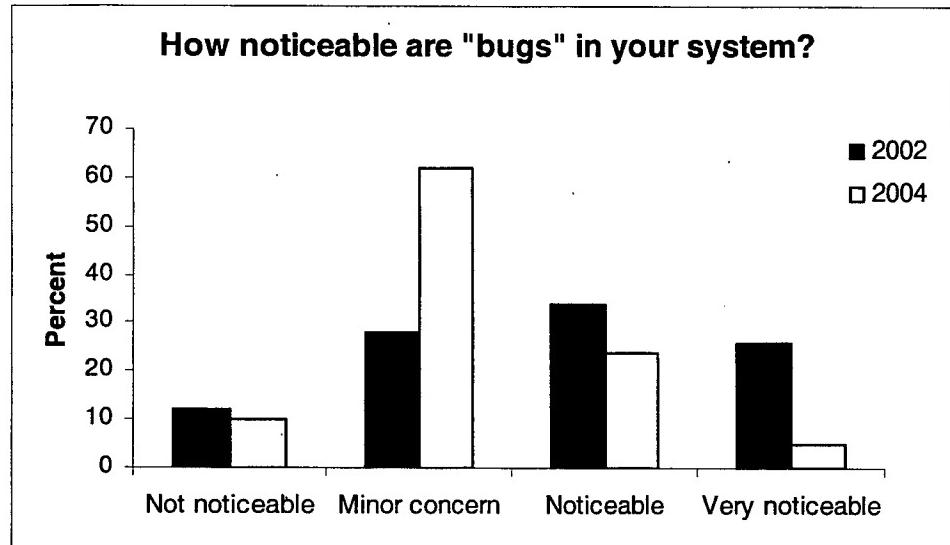


*Figure 4.* Soldiers' response on the questionnaire to, "How do these system problems impact the mission?"

Additional problems that Soldiers report, during interviews and in responding to written questions, using their systems include:

- Slow response time
- Network problems
- System locks up and needs to be rebooted
- Touch screen not sensitive enough
- Broken antenna
- Not rugged enough
- Dust/dirt can harm.

Persistent hardware and software problems resulted in Soldiers feeling overly dependent upon contractors. It should be noted that, although computer problems still exist, they are less noticeable than they were two years ago (see Figure 5). Soldiers attribute this change to their having a better understanding of the system, including their ability to fix minor problems. U.S. Army personnel now assume responsibility for troubleshooting and only turn to contractors for more difficult problems. One Soldier jokingly stated, "We used to depend on them, but when we deploy, they will depend on us!"



*Figure 5. Soldiers' response on questionnaire to, "Most new systems have a few "bugs". "How noticeable are they on your current digital system?" (N=48)*

*Senior commanders need to stress using the systems. System skills are as critical as crew drills on weapon systems.*  
*- Quote from Soldier*

When asked,

*If you were going to deploy next week, what type of digital training would you like to have more experience with? What would you want to learn?*

Nineteen of the 20 Soldiers responded to the question above that they possess a basic understanding of their system but they would like additional training to take full advantage of their system's capabilities. Only one Soldier of the 20 responding considered himself proficient, but he added the caveat that "a refresher would help." Soldiers stated:

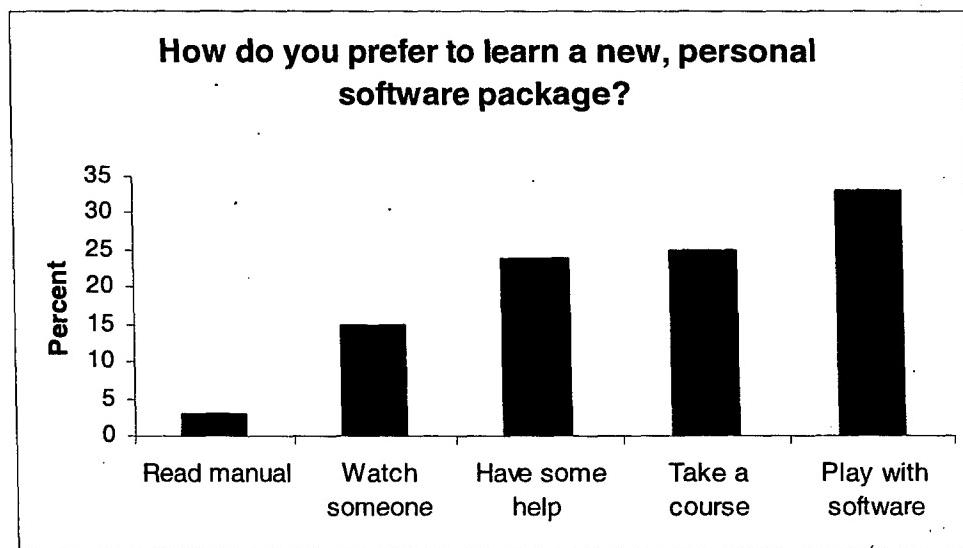
- Learn in more depth how to communicate with other units.
- I can't operate the system to what I think is a good standard. I can only use the map function.
- I need to understand the different types of programs that it has.
- There is a lot of manipulation that you can do with overlays and products that I don't know how to do.
- I want to know how to troubleshoot.
- Not enough hands-on training to reinforce NET.
- I would like follow-up training to get more confident with the system.
- I'd like to refresh myself and be able to help others. If one of them doesn't know how to use the system, it will damage the mission.

These comments may suggest an advanced stage of self-understanding. Soldiers must be able to accurately evaluate their readiness to carry out battlefield-type digital procedures. They must understand where their expertise ends and when they should seek additional information (Schaab, Dressel, & Moses, 2004).

#### *How Soldiers like to learn.*

During the interviews, Soldiers reiterated that classroom training provided the basics, but they want more training, preferably hands-on training in the field. On the questionnaire, forty-two percent of the Soldiers expressed concern about not receiving training in garrison. Furthermore, these same Soldiers felt that there was time available for training on their digital systems during the workday. A small number (9 percent) of the Soldiers were aware of self-training opportunities such as websites or training software.

Soldiers, like their civilian counterparts, preferred to learn by “playing with the software” followed by taking a course or having someone with more experience help them (see Figure 6).



*Figure 6.* Soldiers (N = 46) report, on the questionnaire, their two preferred methods for learning digital systems.

Limited training support materials are available for self-learning, sustainment, and enhancement of digital skills. Although several Soldiers reported during interviews that they received CD-ROM material on their system during their New Equipment Training (NET), none of these Soldiers had used their CD. They report that the CD was similar to a manual and that it was difficult to find specific information. Soldiers wanted more motivating training support materials that presented short exercises to allow them to solve real problems that they might experience when deployed. For example, leaders from one Stryker Brigade captured lessons learned from hostile zones and incorporated them into weekly exercises. This training was relevant and attention grabbing for Soldiers.

### *Successes when Communicating/Collaborating with Digital Systems*

*Digital capabilities allow the instantaneous flow of information from the command level down to computers in the Stryker vehicles that feed Soldiers orders and intelligence updates as they are on the move.*

- Soldier's comments during a training exercise (Ispen, September 19, 2004)

#### *Valuable training.*

Formal classroom training on digital systems is just the first step. We asked Soldiers what training they had found to be the most valuable in learning how to communicate and collaborate with other digital systems. They responded:

- During exercises we learned about the communication devices and how they are all related.
- Classroom training gave me the foundation to build on and I got better by using it.
- How to send messages. It is important for us to get our reports to higher levels so that correct actions can be taken.
- Hands-on training is the best because you can listen to a guy tell you something all day, but until you put your hands on it and see how it works you are not going to know what you are doing.
- I had no formal training but learned everything by getting on the system and playing. Just playing around on the system is the easiest way to learn.
- I learned most everything in the field with a crash course from other users. You learn the major shortcuts in the field.
- Hands-on in the field is the most valuable way to learn because you actually try and use it. The rest is about worthless.

The initial Stryker Brigade consisted of Soldiers new to their digital systems and new to the concept of incorporating these new technologies into missions. Because only a small number of Soldiers had digital experience, it was difficult for leaders to train their Soldiers or for peers to assist each other (Felton, Schaab, & Dressel, 2003). As more and more Soldiers gain experience, they are able to support each others' learning and assist Soldiers new to the technology. The third Stryker Brigade has gathered lessons learned from Fort Lewis. This resulted in many units sending personnel for additional training to become master trainers to develop in-house expertise for their units.

Soldiers today view technology as business as usual rather than an add-on to their already busy training schedule. Seventy percent disagreed with the statement-*Training on our digital systems takes time away from other important training activities.*

After gaining experience using digital technology, most Soldiers report in the questionnaire that they can plan faster and troop movement is safer. For example:

*Planning and preparation is much faster when we can communicate and collaborate using our digital systems (76 percent in agreement).*

*Digital systems make it much safer for troop movement in enemy territory (90 percent in agreement).*

Soldiers responded to the question, "How is technology enhancing mission success?" and provide the following examples.

- Able to communicate where could not before.
- Easier to keep up with all the unit elements. You get a better understanding of personnel who are not properly trained and can identify problems.
- I sent my platoon messages or words in Iraqi and had them translate them into English which increases and broadens their communication between the Iraqis and us.
- I can see where the others are. Without it I would have mistaken a friendly for an enemy.
- Lets us send messages. It is important for us to get our reports to higher levels so that correct actions can be taken.
- FBCB2 lets everyone know what's going on.
- Fast transfer of information on the battlefield. You receive information in a timely manner.
- You can move quicker.
- Everyone is up-to-date and knows what's going on.

#### Recommendations

*We have totally changed the way we think and the way we fight.*  
- Soldier with 16 years in the Army

As Soldiers become more at ease with the Army's technology and gain expertise in how to use its warfighting enhancement capabilities, training needs to continue to evolve. Improvements in training Soldiers who operate digital systems has taken place over the three years that ARI has been talking to these digital-system users. Based on Soldiers' input, the following recommendations are made.

- **CD-ROM/Web-based Training:** More Soldiers have access to these training media, but they may not take full advantage of them. To maximize their use, the training community should listen to what Soldiers tell us about how they like to learn and the types of training that they find the most beneficial. This means that CD-ROM/web-based training should be interactive and present problem-solving vignettes that motivate and challenge Soldiers.
- **System-integration Training:** Successful operations require digital systems to interact within and between other digital systems. Trainers responded to this need by including system-integration training at the beginning of training. This is no longer enough. One commander remarked that current training is like spending a week on your monitor then a week on your keyboard to learn how to operate a computer. Soldiers want training using the suite of systems that they must operate and communicate with, and it should be done as a single training unit. Emphasis should be placed on how to use these systems in conjunction with each other.

A dramatic demonstration of what happens without skilled system integration was seen in a recent Joint exercise where close air support was seriously curtailed due to lack of coordination with ground activities. One side note, FBCB2 coordination was commended, but interoperability with other services lead to problems. As operations become more Joint, system integration training that includes other services becomes increasingly important.

*"We must remain aware that our Army always conducts operations- offensive, defensive, stability and support-in a joint and expeditionary context."*

- The U.S. Army 2004 Posture Statement, R. L. Brownlee and General P. J. Schoomaker

- **Unit Training:** Leaders now understand that **all** personnel who rely on the information from the Army's digital systems should receive training on these systems. Although junior personnel are capable of operating the equipment, they may not possess the in-depth military knowledge necessary to interpret and integrate information.
- **Unit Training:** To develop expertise beyond simply understanding which icon to click, Soldiers need hands-on experience in a variety of situations. This hands-on experience should begin as soon as possible following NET training to ensure that what is learned is not forgotten. An added benefit is that challenging exercises improve morale. One company commander administered a survey to his Soldiers while they were involved in classroom training of their digital systems. He found that morale was low. He developed several short training events where Soldiers used their systems. Following this training, he re-administered his survey and found a significant improvement in morale. This wise commander noted, "Challenging training that is meaningful makes for a happy Soldier." It also makes a more competent one.
- **Unit Training:** Soldiers need to train on their systems to fully understand its capabilities and so that operation becomes automatic. Under stress, Soldiers need to respond quickly and accurately. If this training is to generalize, it should take place in many different situations. This training must include interacting with other digital systems that they might encounter in the field.
- **Collaboration:** Soldiers continue to experience problems with equipment that inhibits collaboration with other systems. These problems are becoming less important as Soldiers understand how to solve more problems themselves rather than needing to call upon contractors. Soldiers need to practice how to operate when their system is not up. For example, how do you ensure that you are not mistaken for the enemy if your position reporting system is down?
- **Collaboration:** Soldiers tell us they follow-up a digital transmission with a voice confirmation. This increases workload and time. Additional collaborative training should help Soldiers recognize clues that a communication has not taken place and to know what types of communications require a voice backup. In one interview

session, Soldiers, who had confirmed digital transmissions with their radio, said they did not realize that you could determine when a message had been opened.

The Stryker Brigades are leaders in the Army's transformation to a more efficient and effective force. This report is meant to contribute to our understanding of how Soldiers gain their expertise in this net-centric environment so that the Army's outstanding training programs can become even better.

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## Appendix A

### Digital Task Proficiency Umbrella Week Questionnaire July 2004-Fort Lewis

Last 4 digits of SSN: \_\_\_\_\_ M or F (Circle) What is your MOS/skill level? \_\_\_\_\_

Time in Service \_\_\_\_\_ Rank \_\_\_\_\_ Duty Position \_\_\_\_\_

How long have you been in a Stryker Brigade? \_\_\_\_\_

Training on Army digital systems

Which system(s) do you operate? If more than one, put "1" by the system that you have the most experience operating, put "2" by the one you have the second most experience operating, etc.

ASAS,  AMDWS,  CSSCS,  MCS,  AFATDS,  FBCB2

Other, Describe \_\_\_\_\_

"Formal" training that you have received on your digital system. (Check all that apply.)

AIT

*How long was the training?* \_\_\_\_\_

NET Training (How to use the system.)

*How long was the training?* \_\_\_\_\_

NET Delta Training (Changes to the system due to upgrade.)

*How long was the training?* \_\_\_\_\_

CD ROM introductory/refresher training or on-line training

*How long was the training?* \_\_\_\_\_

Systems Integration Training

*How long was the training?* \_\_\_\_\_

Other. Describe \_\_\_\_\_

How long have you been operating your digital system?

Less than one month

One to six months

Six months to 1 year

One to 2 years

More than 2 years

Do you think that it is a good idea for the Army to keep digitally trained Soldiers in digital units?

Definitely yes

Probably

Not sure

Probably not

Definitely no

**Most new systems have a few "bugs". How noticeable are they on your current digital system?**

- Very noticeable
- Noticeable
- Minor problem
- Not noticeable

**Is there time available during duty hours to practice your skills on your digital system if training resources (CD, manuals, on line help, practice vignettes/scenarios) were available?**

Yes       No      If yes, how often? \_\_\_\_\_

**How would you compare your know-how on your Army digital system to that of your immediate supervisor?**

I know much More	I know a little More	About the same	Supervisor knows a little more	Supervisor knows much more
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**In the field, what determines who operates a digital system:**

knowledge of the system     rank     other: Describe \_\_\_\_\_

**How do you prefer to learn a new personal software package? (List your first choice as "1" and your second choice as "2.")**

- |   |  |
|---|--|
| <input type="checkbox"/> Read the manual      | <input type="checkbox"/> Play with the program |
| <input type="checkbox"/> Watch someone use it | <input type="checkbox"/> Have someone help me  |
| <input type="checkbox"/> Take a course        | <input type="checkbox"/> Does not apply to me  |

### **Interoperability**

**What digital system(s) do you send information to?**

ASAS,  AMDWS,  CSSCS,  MCS,  AFATDS,  FBCB2

Other, Describe \_\_\_\_\_

**What digital system(s) do you receive information from?**

ASAS,  AMDWS,  CSSCS,  MCS,  AFATDS,  FBCB2

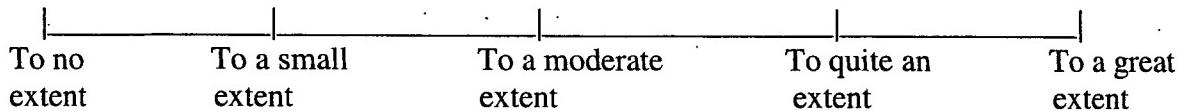
Other, Describe \_\_\_\_\_

**How frequently do you interact with these systems during exercises?**

- Rarely (For example, several times during a week-long exercise)
- Occasionally (For example, once or twice a day.)
- Frequently (For example, multiple times during the day.)
- Continuously during the exercise.

**To what extent is collaboration/coordination between operators of Army digital systems necessary for mission success?**

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**Did your formal training include how to interact with any other digital systems?**

Yes     No If yes, what system(s)? \_\_\_\_\_

**Did your formal training include familiarization with the functions of other digital systems with which you interact i.e., send or receive messages/reports? \_\_\_\_\_ Yes \_\_\_\_\_ No**

If Yes, which systems and was this training helpful? \_\_\_\_\_ Yes \_\_\_\_\_ No  
Explain \_\_\_\_\_

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If No, do you think this training would have been helpful ? \_\_\_\_\_ Yes \_\_\_\_\_ No  
Explain \_\_\_\_\_

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**Unit training on your digital system:** When you train in your unit, what systems exchange information?

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**What types of problems do you experience when interacting between digital systems?  
(Missed messages? Confused messages? Delayed messages?)**

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**How do these problems impact the mission?**

- No impact
- Minor impact
- Some impact
- Major impact

**Field exercise using your digital system:** When you train in the field, what systems exchange information?

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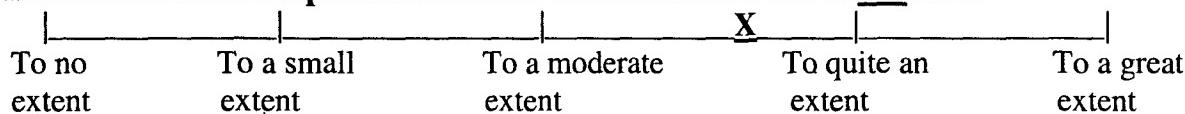
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**Digital Team** NOTE: ("X") indicates mean response by Soldiers.

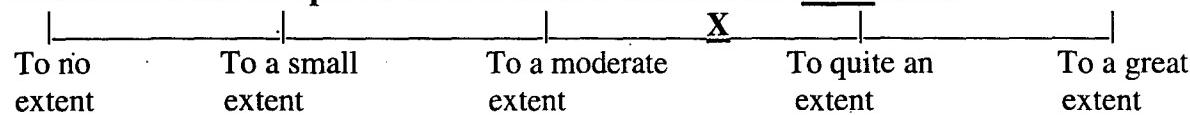
A digital team is a group of Soldiers who are digitally connected and whose inputs you need in order to successfully do your job. This may be within a unit (e.g., ASAS operators sharing information with other ASAS operators) or between units (e.g., ASAS and AFATDS interfacing for target nominations and acquisition).

**To what extent do each of the following task descriptions apply to your digital team?**

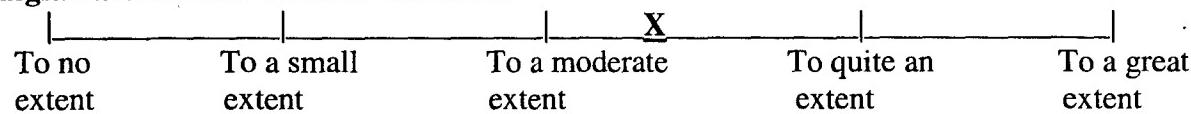
- a. Successful task/mission performance requires team members to obtain information about the mission and pass it on to other team members within our unit.



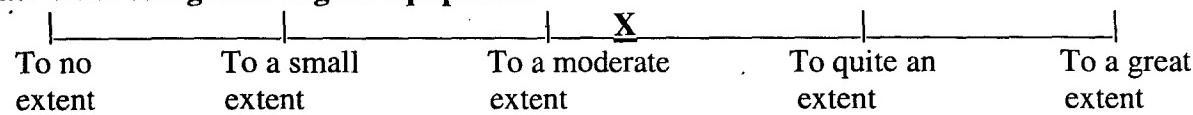
- b. Successful task/mission performance requires team members to obtain information about the mission and pass it on to other team members in other units.



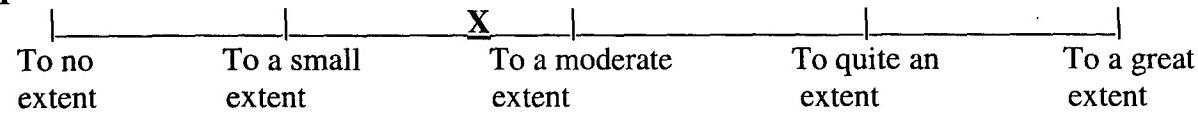
- c. Successful task/mission performance is dependent on a leader to closely coordinate the digital activities of all team members.



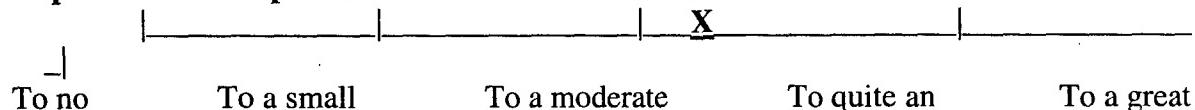
- d. Successful task/mission performance requires team members to coordinate their activities using their digital equipment.



- e. The tasks are such that if one member working on their digital equipment cannot perform adequately (e.g., fast enough) another member can "make up for" that performance.

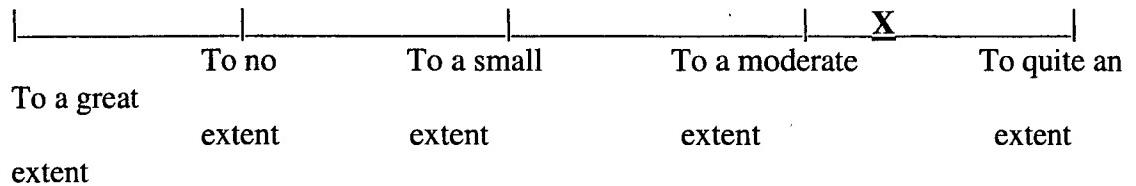


- f. Task performance by team members using digital is dependent of timing, quality, or completeness of the performance of other team members.

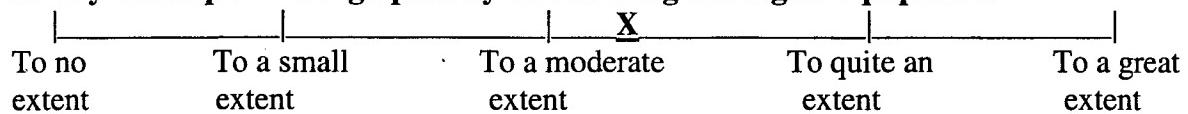


extent extent extent extent extent

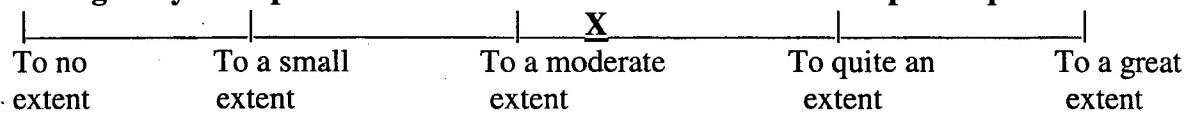
- g. A team member needs to know his buddies and know how they will react in certain situations.



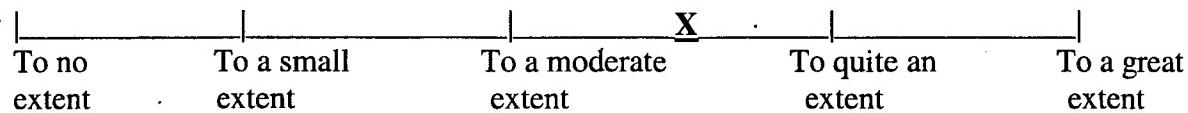
- h. My leader places a high priority on our using our digital equipment.



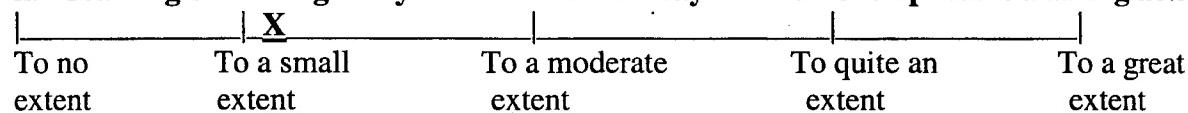
- i. Digital systems provide more time for us to think and develop multiple COAs.



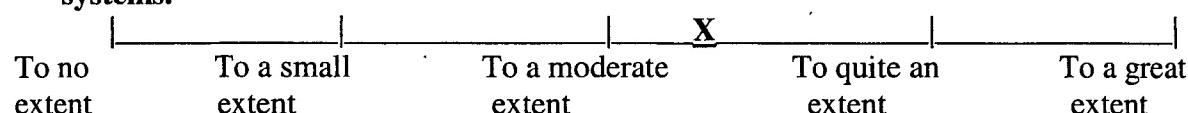
- j. Once we understood the limitations and capabilities of the digital systems we were able to use them in new and better ways.



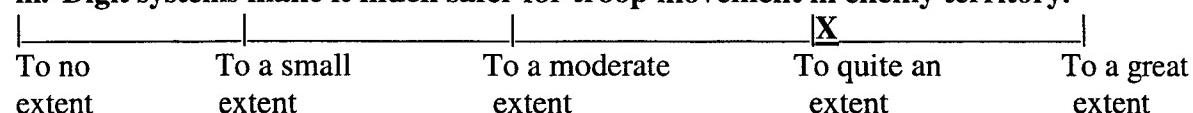
- k. Training on our digital system takes time away from other important training activities.



- l. Planning and preparation is much faster when we can collaborate using our digital systems.



- m. Digit systems make it much safer for troop movement in enemy territory.



**To what extent do the following factors cause frequent or critical problems in the performance of your digital team?**

**Frequent turnover in digital team members.**

To no extent	To a small extent	X	To a moderate extent	To quite an extent	To a great extent
<b>Inadequate amount of team training using digital equipment</b>					
To no extent	To a small extent		X		
To no extent	To a small extent	To a moderate extent		To quite an extent	To a great extent

**Team training is not realistic.**

To no extent	To a small extent		To a moderate extent	To quite an extent	To a great extent
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**Team is not given the opportunity to train with other digital units.**

To no extent	To a small extent	X	To a moderate extent	To quite an extent	To a great extent
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**The current composition of the team is inadequate (e.g., more or fewer members are needed or different types of personnel are needed)**

To no extent	To a small extent		X	To a moderate extent	To quite an extent	To a great extent
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**Lack of coordination between team members.**

To no extent	To a small extent	X	To a moderate extent	To quite an extent	To a great extent
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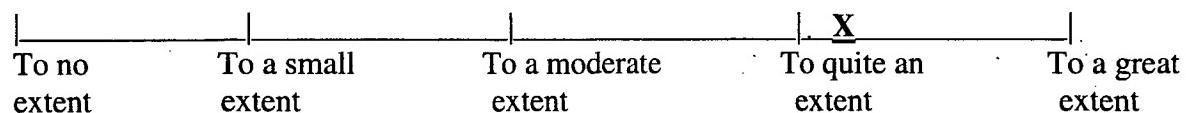
**Joint Training Opportunities**

The Army's Chief of Staff has established the Joint and Expeditionary Mindset as an immediate focus area to increase relevance and readiness of the Army.

**What services have you worked or trained with in the past? (Check all that apply.) N=50**

2% Navy 8% Marines 42% Air Force 42% None

**To what extent does interacting with other services contribute to accomplish military missions?**



**Interacting with other services to successfully accomplish military missions should:**

- 70% Increase  
30% Stay the same  
           Decrease

## **Appendix B**

### **Written Questions on Digital Collaboration**

In groups of 4-6 Soldiers, the following questions were answered with a written response. After responding, Soldiers rated the best responses. The number of Soldiers in each group was equal to the number of questions asked, therefore, all Soldiers did not respond to all questions.

- If you were going to deploy next week, what type of digital training would you like to have more experience with? What would you want to learn?
- Describe a success that you experienced when communicating or collaborating using your digital system. What were the consequences?
- Describe a major problem that you experiences when communicating or collaborating using your digital system. What were the consequences?
- How is technology enhancing mission success? What training was the most valuable in learning how to communicate and collaborate with other digital systems? Why was it valuable?
- How does your immediate supervisor assist you in training how to use your digital system to communicate with other systems? What else would you like for him or her to do to help you learn more?
- Should some of your training or exercises using digital systems include other Services? Why or why not?

## **Appendix C**

### **Interview Questions**

For our discussions today, when we refer to digital collaboration, we mean working together, while geographically separated, via digital systems (computers) to perform a task. Each person has their own responsibilities and one person's output or product may be another person's input to act upon.

1. Describe how you collaborate with other units using your digital system.
  - a. What problems did you experience other than hardware problems and how did you overcome these problems?
  - b. Did you have successful collaborations using digital systems?
  - c. Did you collaborate with non-Army units?
2. What training was most valuable in learning how to communicate and collaborate with other digital systems?
  - a. Cross-training
  - b. Peer training
  - c. Expertise of immediate supervisor
3. What lessons learned would you share with new SBCTs on how to learn their digital system and how to use collaborate with other systems?
4. What other competencies are required (other than knowing how to operate own equipment and its functions) to be effective team members within unit, across unit, within service, and across services? How are these competencies acquired?
5. How is training conducted within the unit of those operators who must interact to perform their tasks? How effective is this training? How is the effectiveness measured?
6. How is training conducted across units that must interact to perform their tasks? How effective is this training? How is the effectiveness measured?
7. How is Joint Training conducted in which operators must interact with operators of other services to perform their tasks? How effective is this training? How is the effectiveness measured?
8. Have you used your system in the NTC, JNTC, or combat? Please describe how it went.

Sgt 1. What do you see as the types of **missions** of the Objective Force (U.S. Army of 2010)? How do they differ from what is being done today? On which of these missions is the SBCT being trained?

Sgt 2. What types of **tasks** will the OF units perform in the future? How do they differ from what is done today? On which of these tasks is the SBCT being trained?

Sgt 3. How will the **new capabilities** of the Objective Force **change** how these missions and tasks are performed? (Number of personnel, types of personnel, casualties, speed, training, joint interactions, decision making, etc.)